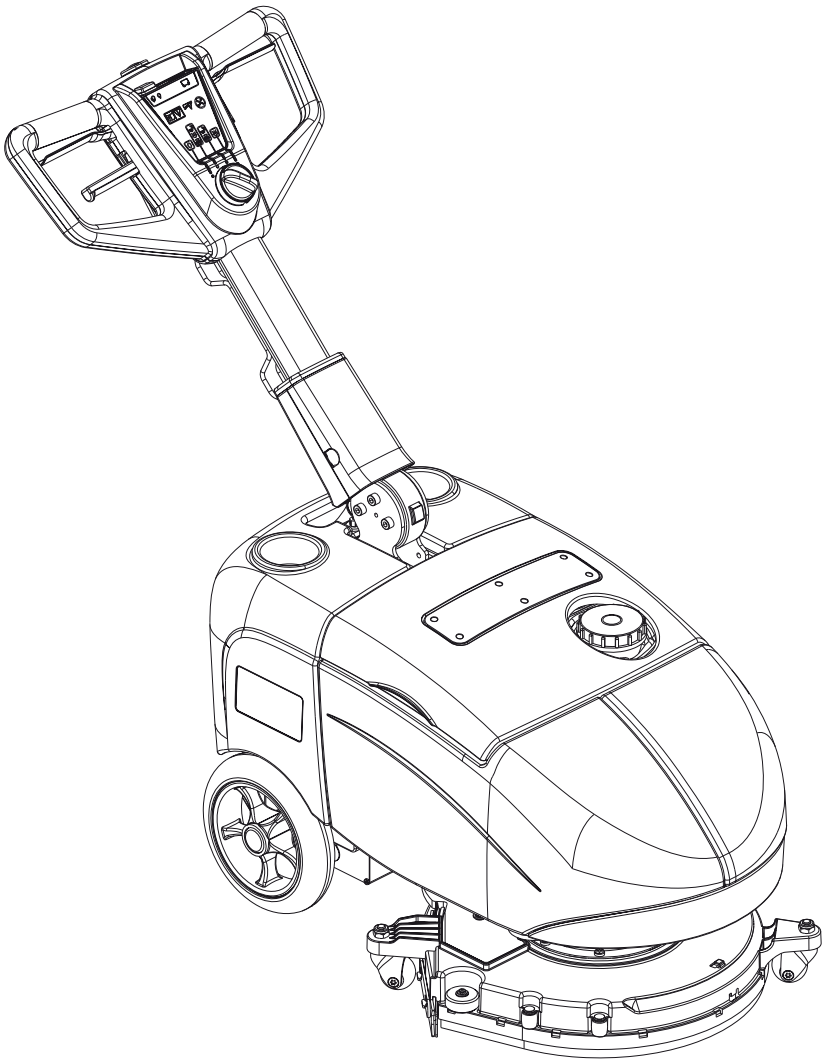
SC350

SERVICE MANUAL GB



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setting standards

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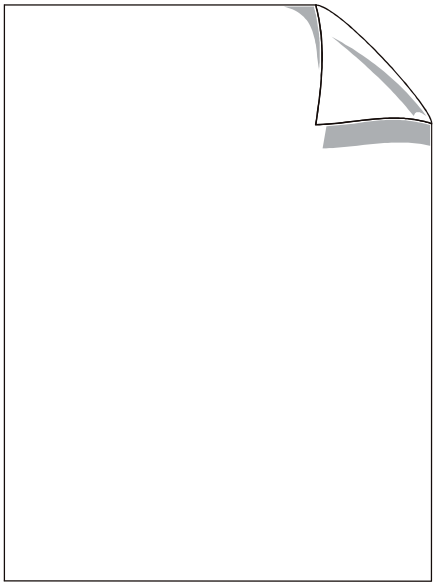


GENERAL INFORMATION

CONVENTIONS

Forward, backward, front, rear, left or right are intended with reference to the operator's position, that is to say in driving position.

MACHINE LIFTING

WARNING!
Do not work under the lifted machine without supporting it with safety stands.

MACHINE TRANSPORTATION

WARNING!
Before transporting the machine, make sure that:
- ***All covers are closed.***
- ***The battery is disconnected.***
- ***The machine is securely fastened to the means of transport.***

OTHER REFERENCE MANUALS

The following manuals are available at Nilfisk Literature Service Department:
- Documentation CD-ROM - Nilfisk Form Number 9098867000
- SC350 User Manual - Nilfisk Form Number 9098868000
- SC350 Spare Parts List - Nilfisk Form Number 9098869000
- SC350 Quick Start Guide - Nilfisk Form Number 9098866000

SAFETY

The following symbols indicate potentially dangerous situations. Always read this information carefully and take all necessary precautions to safeguard people and property.

SYMBOLS

DANGER!
It indicates a dangerous situation with risk of death for the operator.

WARNING!
It indicates a potential risk of injury for people or damage to objects.

CAUTION!
It indicates a caution related to important or useful functions.
Pay careful attention to the paragraphs marked by this symbol.

NOTE
It indicates a remark related to important or useful functions.

CONSULTATION
It indicates the necessity to refer to the User Manual before performing any procedure.

GENERAL INFORMATION

GENERAL INSTRUCTIONS

Specific warnings and cautions to inform about potential damages to people and machine are shown below.

DANGER!

- ***Before performing any machine maintenance, repair, cleaning or replacement procedure, disconnect the battery connector and turn the main switch to "0".***
- ***This machine must be used by properly trained operators only.***
- ***Keep the battery away from sparks, flames and incandescent material. During the normal operation explosive gases are released.***
- ***Do not wear jewels when working near electrical components.***
- ***Do not work under the lifted machine without supporting it with safety stands.***
- ***Do not operate the machine near toxic, dangerous, flammable and/or explosive powders, liquids or vapours: This machine is not suitable for collecting dangerous powders.***
- ***Battery charging produces highly explosive hydrogen gas. Keep the cover open during battery charging and perform this procedure in well-ventilated areas and away from naked flames.***

WARNING!

- ***Carefully read all the instructions before performing any maintenance/repair procedure.***
- ***Before using the battery charger, ensure that frequency and voltage values, indicated on the machine serial number plate, match the electrical mains voltage.***
- ***Do not pull or carry the machine by the battery charger cable and never use the battery charger cable as a handle. Do not close a door on the battery charger cable, or pull the battery charger cable around sharp edges or corners. Do not run the machine on the battery charger cable.***
- ***Keep the battery charger cable away from heated surfaces.***
- ***Do not use the machine if the battery charger cable or plug is damaged. If the machine is not working as it should, has been damaged, left outdoors or dropped into water, return it to the Service Center.***
- ***To reduce the risk of fire, electric shock, or injury, do not leave the machine unattended when it is plugged in. Before performing any maintenance procedure, disconnect the battery charger cable from the electrical mains.***
- ***Do not smoke while charging the battery.***

GENERAL INFORMATION

WARNING!

- ***Always protect the machine against the sun, rain and bad weather, both under operation and inactivity condition. Store the machine indoors, in a dry place: This machine must be used in dry conditions, it must not be used or kept outdoors in wet conditions.***
- ***Before using the machine, close all doors and/or covers as shown in the User Manual.***
- ***Do not allow to be used as a toy. Close attention is necessary when used near children.***
- ***Use only as shown in this Manual. Use only Nilfisk's recommended accessories.***
- ***Take all necessary precautions to prevent hair, jewels and loose clothes from being caught by the machine moving parts.***
- ***Pay attention to the machine moving parts. When using the machine, the deck can abruptly turn by 180°.***
- ***Do not use the machine on incline.***
- ***Do not tilt the machine more than the angle indicated on the machine itself, in order to prevent instability.***
- ***Do not use the machine in particularly dusty areas.***
- ***Use the machine only where a proper lighting is provided.***
- ***While using this machine, take care not to cause damage to people or objects.***
- ***Do not bump into shelves or scaffoldings, especially where there is a risk of falling objects.***
- ***Do not lean liquid containers on the machine, use the relevant can holder.***
- ***The machine working temperature must be between 0°C and +40°C.***
- ***The machine storage temperature must be between 0°C and +40°C.***
- ***The humidity must be between 30% and 95%.***
- ***When using floor cleaning detergents, follow the instructions on the labels of the detergent bottles.***
- ***To handle floor cleaning detergents, wear suitable gloves and protections.***
- ***Do not allow the brushes to operate while the machine is stationary to avoid damaging the floor.***
- ***In case of fire, use a powder fire extinguisher, not a water one.***
- ***Do not tamper with the machine safety guards and follow the ordinary maintenance instructions scrupulously.***
- ***Do not allow any object to enter into the openings. Do not use the machine if the openings are clogged. Always keep the openings free from dust, hairs and any other foreign material which could reduce the air flow.***
- ***Do not remove or modify the plates affixed to the machine.***
- ***This machine cannot be used on roads or public streets.***
- ***Pay attention during machine transportation when temperature is below freezing point. The water in the recovery tank or in the hoses could freeze and seriously damage the machine.***
- ***Use brushes and pads supplied with the machine and those specified in the User Manual. Using other brushes or pads could reduce safety.***
- ***In case of machine malfunctions, ensure that these are not due to lack of maintenance. Otherwise, request assistance from the authorised personnel or from an authorised Service Center.***
- ***If parts must be replaced, require ORIGINAL spare parts from an Authorised Dealer or Retailer.***
- ***To ensure machine proper and safe operation, the scheduled maintenance shown in the relevant chapter of this Manual, must be performed by the authorised personnel or by an authorised Service Center.***
- ***Do not wash the machine with direct or pressurised water jets, or with corrosive substances.***
- ***The machine must be disposed of properly, because of the presence of toxic-harmful materials (battery, etc.), which are subject to standards that require disposal in special centres (see Scrapping chapter on the User Manual).***

GENERAL INFORMATION

TECHNICAL DATA

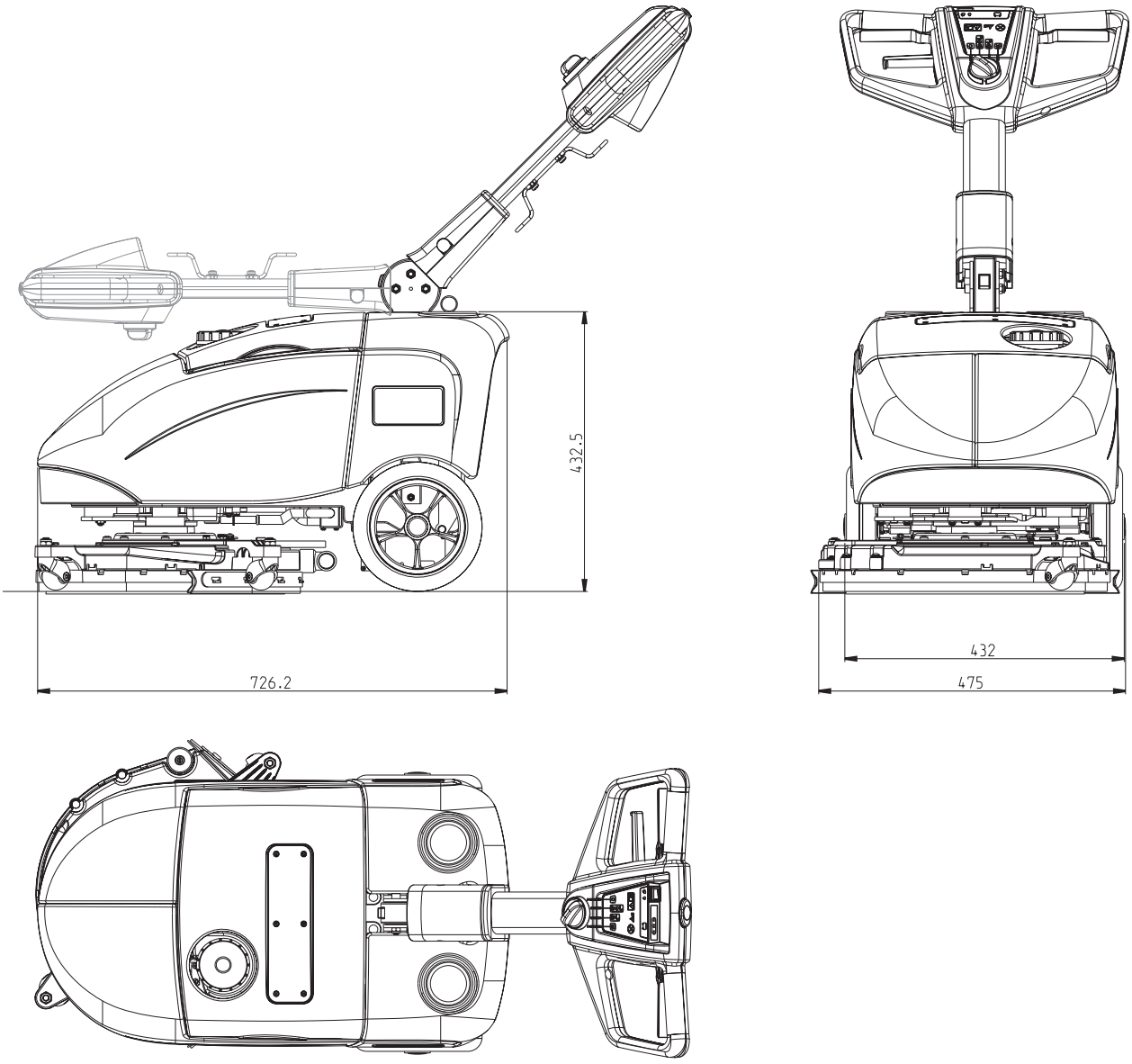
General	SC350
Min/max machine length at the handlebar	810/1,270 mm
Machine width	470 mm
Min/max machine height with adjustable handlebar	550/1,000 mm
Weight without battery and with empty tanks	42 kg
Maximum weight with battery and full tanks (GVW)	80 kg
Cleaning width	370 mm
Battery compartment size	350x175x240 mm
Diameter of wheels on fixed axle	200 mm
Brush/pad diameter	370 mm
Rear wheel pressure on the floor (*)	0.5 N/mm^2
Brush/pad pressure on the floor	18 kg
Brush/pad pressure with full tank	27 kg

Performance	SC350
Vacuuming	710 mmH_2O
Min/max solution flow	SET1: 0.25 litres/min SET2: 0.5 litres/min
Brush/pad-holder motor speed	140 rpm
Sound pressure level at workstation (ISO 11201, ISO 4871, EN 60335-2-72) (LpA)	65 dB(A) ± 3dB(A)
Machine sound pressure level (ISO 3744, ISO 4871, EN 60335-2-72) (LwA)	84 dB(A)
Vibration level at the operator's arms (ISO 5349-1, EN 60335-2-72)	< 2.5 m/s^2
Vacuum system motor power	200 W
Brush/pad motor power	240 W
Maximum gradient when working	2%
Battery voltage	12 V
Standard battery	12V 55AhC20 AGM Spiralcell
Standard battery autonomy	1 hour
Solution tank capacity	11 litres
Recovery tank capacity	11 litres

(*) Machines have been tested under the following conditions:
- Maximum battery size
- Maximum brush and squeegee size
- Full clean water tank
- Optional components installed
- Weight on wheels checked
- Print on the floor checked on cement for each single wheel
- Result expressed as maximum value for rear wheels

GENERAL INFORMATION

DIMENSIONS



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GENERAL INFORMATION

MAINTENANCE

The lifespan of the machine and its maximum operating safety are ensured by correct and regular maintenance.

WARNING!
Read carefully the instructions in the Safety chapter before performing any maintenance procedure.

The following table provides the scheduled maintenance. The intervals shown may vary according to particular working conditions, which are to be defined by the person in charge of the maintenance.
For instructions on maintenance procedures, see the following paragraphs.

SCHEDULED MAINTENANCE TABLE

Procedure	Daily, after using the machine	Weekly	Every six months	Yearly
Squeegee cleaning				
Brush cleaning				
Tank and vacuum grid cleaning				
Squeegee blade check and/or replacement				
Battery charging				
Screw and nut tightening check			(1)	
Brush deck rubber pad check and/or replacement				
Brush deck end-of-stroke cable check and/or replacement				
Brush deck rubber flange check and/or replacement				

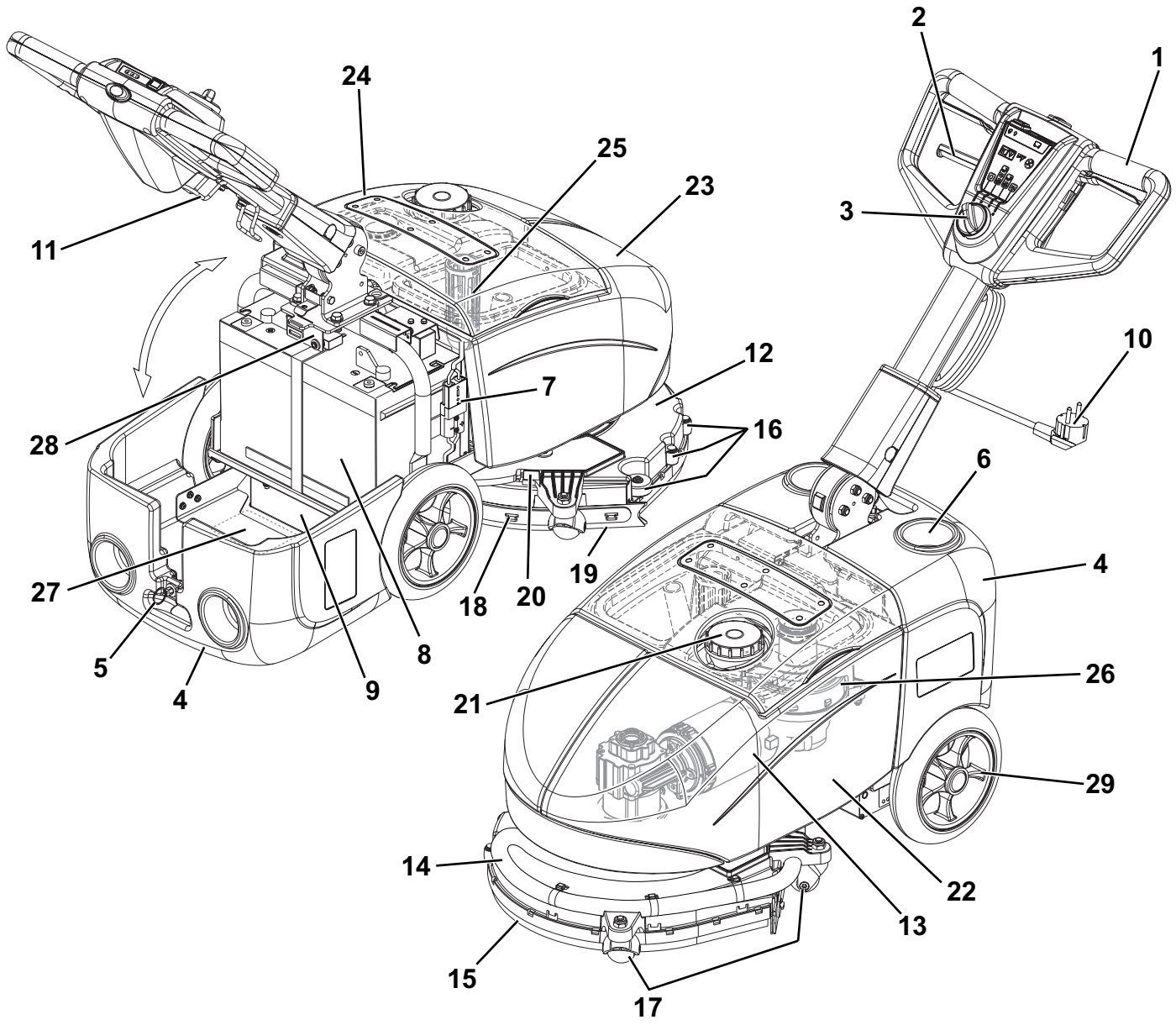
(1) And after the first 8 working hours.

GENERAL INFORMATION

MACHINE NOMENCLATURE

Throughout this Manual you will find numbers in brackets – for example: (2). These numbers refer to the components indicated in these nomenclature pages. Refer to these pages whenever you need to identify a component mentioned in the text.

1. Handlebar with control panel (see the following paragraph)
2. Handlebar inclination adjusting lever
3. Start-up and program selection knob
4. Accessory and battery compartment cover
5. Cover latch
6. Can holder
7. Battery connection connector
8. GEL/AGM battery
9. Battery charger
10. Battery charger cable
11. Battery charger cable holder
12. Brush/pad-holder deck
13. Brush deck gearmotor
14. Squeegee vacuum hose
15. Splash-shield
16. Deck bumper wheels
17. Deck support wheels
18. Squeegee
19. Squeegee blades assembly
20. Squeegee fasteners
21. Solution tank filler plug
22. Solution tank
23. Recovery tank
24. Transparent cover with vacuum grid
25. Vacuum grid with automatic shut-off float
26. Vacuum system motor
27. Serial number plate/technical data/conformity certification
28. Fuses
29. Rear wheels on fixed axle



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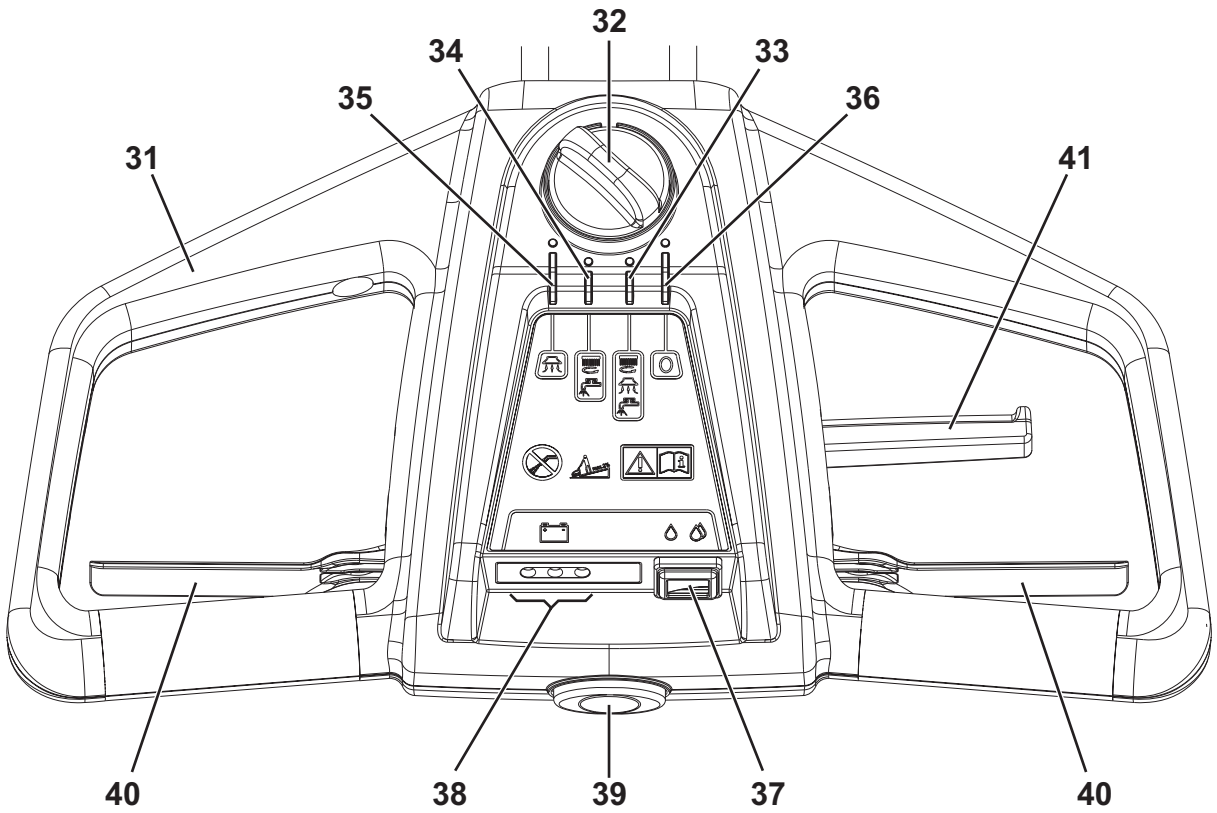
GENERAL INFORMATION

MACHINE NOMENCLATURE (Continues)

31. Handlebar
32. Program selection knob
33. Program: brush - vacuum system - solution flow activation
34. Program: brush - solution flow activation
35. Program: vacuum system activation
36. Machine switching off (“0”)
37. Solution flow control switch
    - One drop - minimum solution flow
    - Two drops - maximum solution flow
38. Battery warning lights
    - Green warning light - charged battery
    - Yellow warning light - semi-discharged battery
    - Red warning light - discharged battery
39. Machine start-up enabling push-button
40. Machine start/stop levers
41. Handlebar inclination adjusting lever



P100419

DETERGENT SUPPLY SYSTEM

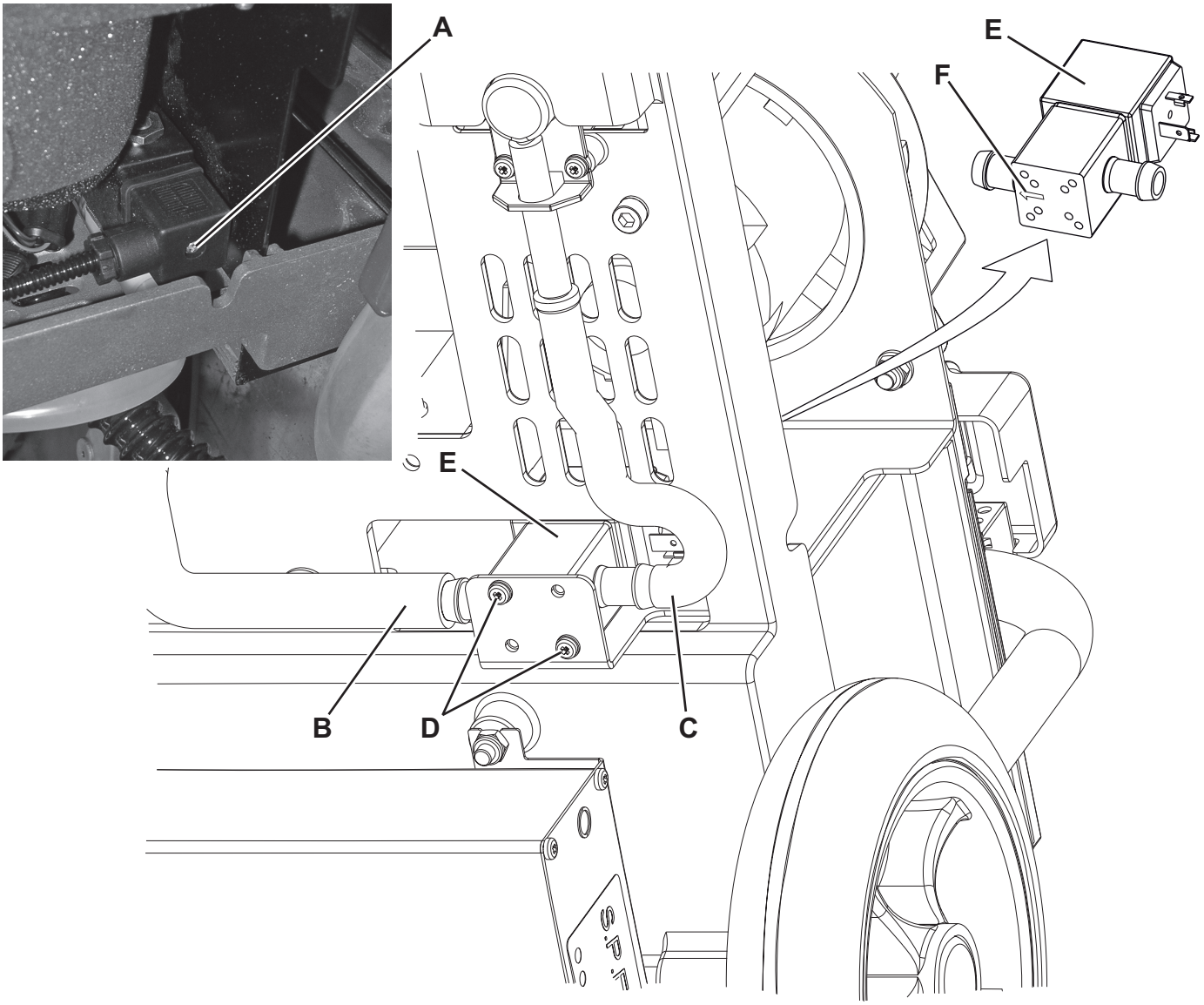
SOLUTION SYSTEM SOLENOID VALVE DISASSEMBLY/ASSEMBLY

Disassembly

1. Place the machine on a hoisting system (if available), then lift it. Otherwise, drive the machine on a level floor.
2. Make sure that the battery connector is disconnected.
3. Remove the cover and the solution and recovery water tanks.
4. Remove the solenoid valve power supply connector (A).
5. Disconnect the hoses (B) and (C) under the machine.
6. Remove the screws (D) and recover the washers.
7. Remove the solenoid valve (E) upwards.

Assembly

8. Assemble the components in the reverse order of disassembly and note the following:
   - When assembling the solenoid valve (E), the stamped arrow (F) must be tuned in the direction of the solution flow as shown in the figure.



P100420

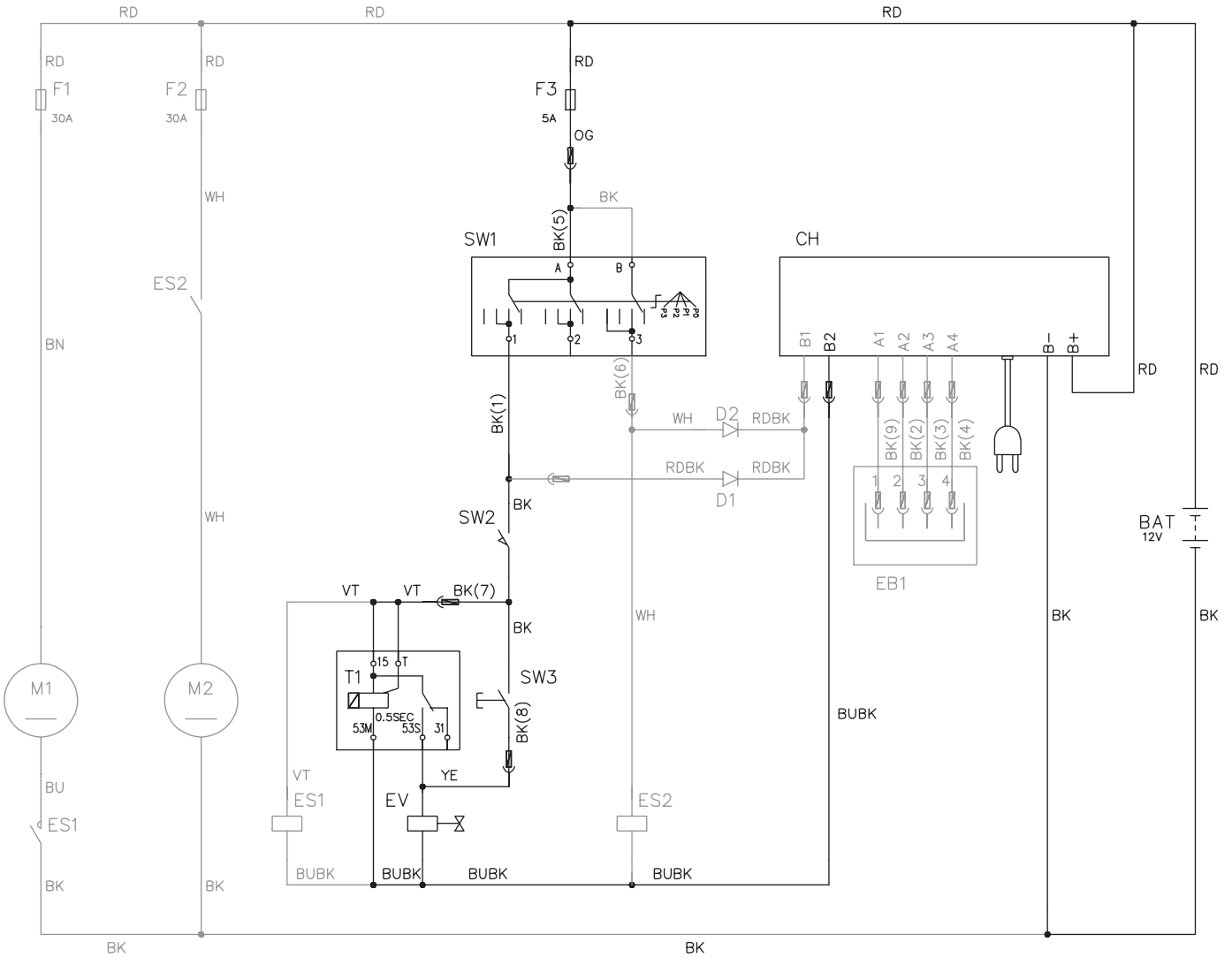
DETERGENT SUPPLY SYSTEM

TROUBLESHOOTING

Small amount of solution or no solution reaches the brush
Possible causes:
1. The solution tank valve is clogged/dirty or broken (clean or replace).
2. The solenoid valve (EV) is broken or there is an open in the electrical connection (replace the solenoid valve/repair the electrical connection).
3. There is debris in the solution tank clogging the output hole (clean the tank).
4. There is debris in the solution hoses and/or reducer clogging the flow (clean the hose).

The solution reaches the brush also when the machine is off
Possible causes:
1. There is dirt or calcium deposit on the solenoid valve gasket (clean).
2. The solenoid valve is broken (replace).

WIRING DIAGRAM



P100421

BRUSHING SYSTEM

BRUSH MOTOR ELECTRICAL INPUT CHECK

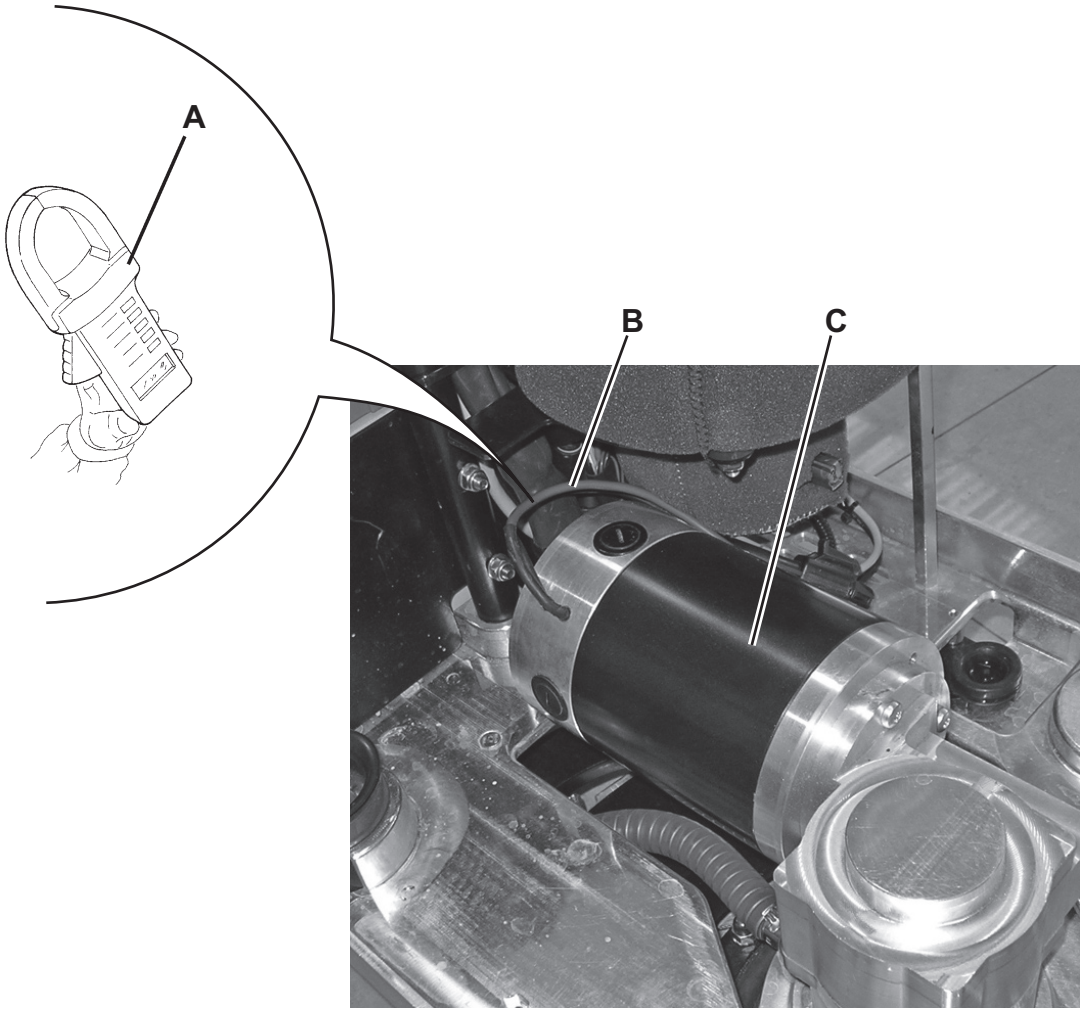
WARNING!
This procedure must be performed by qualified personnel only.

1. Drive the machine on a level floor.
2. Remove the brush, as shown in the User Manual.
3. Place two wooden shims (A) under the side area of the deck as shown in the figure. Wooden shim thickness must be 40 mm.

WARNING!
Keep the wooden shims at an appropriate distance from the brush hub.

4. Turn the knob (32) to program (34).
5. Apply the amperometric pliers (A) on one cable (B) of the brush motor.
6. Turn on the brush by pressing the push-button (39) together with the levers (40), then check that the motor electrical input (C) is:
   - 6 to 8 A at 12V
7. Turn off the brush by releasing the levers (40).
8. Turn the knob (32) to “0”.
   Remove the amperometric pliers (A).
   If the electrical input is higher, perform the following procedures to detect and correct the abnormal input:
   - Check if there is dust or dirt (ropes, cables, etc.) on the brush hubs.
   - Disassemble the motor (see the procedure in the relevant paragraph), and check the condition of all its components.

   If the above-mentioned procedures do not lead to a correct electrical input, the motor must be replaced (see the procedure in the relevant paragraph).



P100422

BRUSHING SYSTEM

BRUSH MOTOR DISASSEMBLY/ASSEMBLY

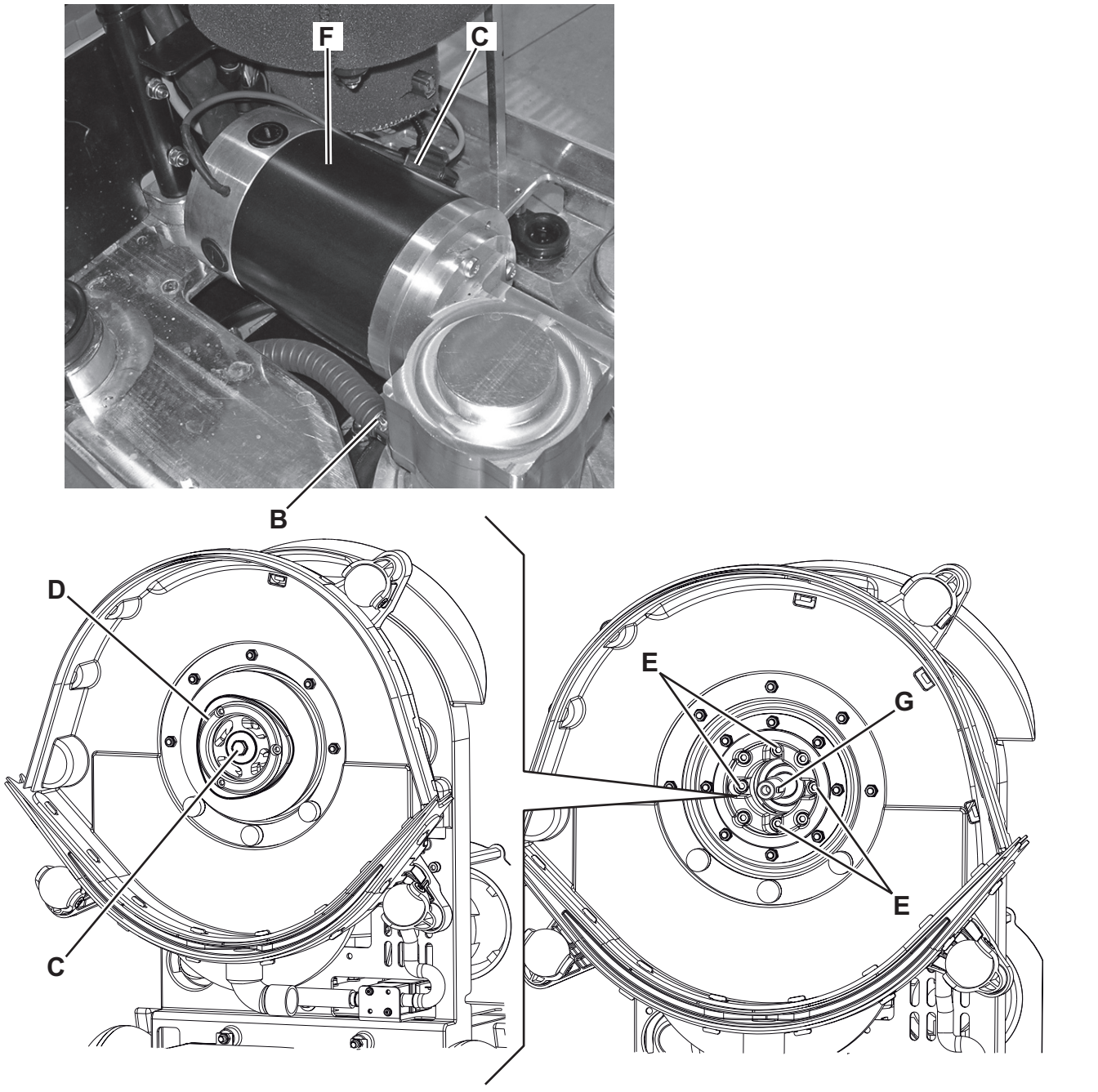
Disassembly

1. Place the machine on a hoisting system (if available), then lift it. Otherwise, drive the machine on a level floor.
2. Make sure that the battery connector is disconnected.
3. Disconnect the gearmotor connector (A) and the detergent hose (B).
4. Lift the machine and remove the brush.
5. Remove the screw (C), then remove the hub assembly (D).
6. Remove the 4 screws (E).
7. Remove the gearmotor (F).
8. Recover the key (G).

Assembly

9. Assemble the components in the reverse order of disassembly.

NOTE
For further information on deck components see the Spare Parts List.



P100423

BRUSH DECK DISASSEMBLY/ASSEMBLY

Disassembly

1. Place the machine on a hoisting system (if available), then lift it. Otherwise, drive the machine on a level floor.
2. Make sure that the battery connector is disconnected.
3. Disconnect the vacuum hose from the squeegee.
4. Disassemble the end-of-stroke cable fastener.
5. Lift the machine and remove the brush.
6. Remove the screw and the hub assembly (see the previous paragraph).
7. Remove the 4 screws (A), the flange (B) and disassemble the brush deck (C).
8. Check the rubber pads (D) for integrity; if necessary replace them by removing the 3 nuts (E).

NOTE
The rubber pads (D) allow the deck mechanical rotation by creating friction on the rotating brush.

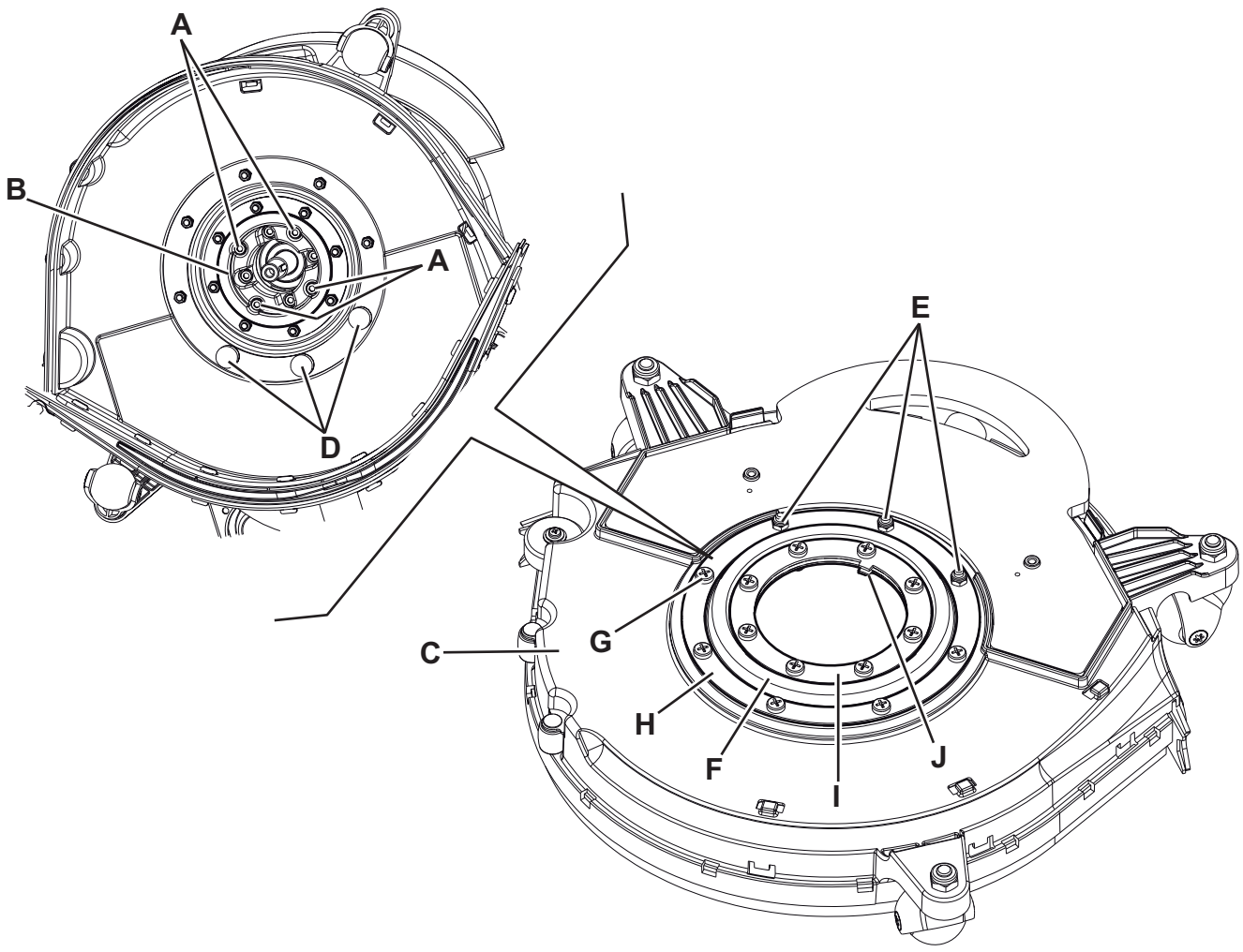
9. Check the rubber joint (F) for integrity; if necessary remove the 13 screws (G), recover the nuts, flanges (H) and (I), and replace it.

NOTE
The rubber joint (F) absorbs blows and vibrations between the deck and the machine.

Assembly

10. Assemble the components in the reverse order of disassembly and note the following:
    - When the rubber joint (F) is fastened to the deck, install the flanges (I) by placing their tooth (J) as shown in the figure.

NOTE
For further information on deck components see the Spare Parts List.



P100424

BRUSHING SYSTEM

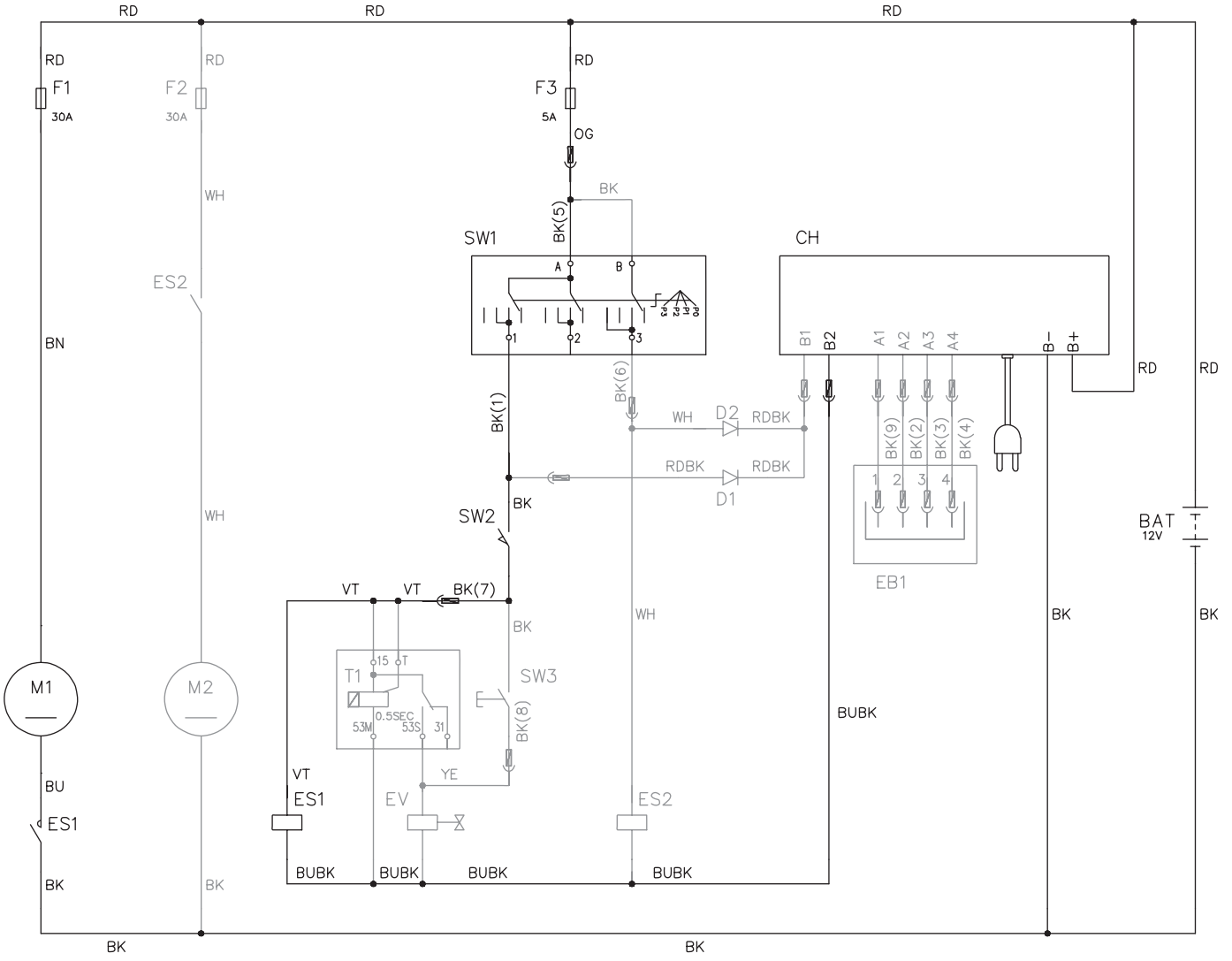
TROUBLESHOOTING

Open circuit
The resettable fuse (F1) determines an open in the supply circuit of the brush deck motor. This system allows to prevent the circuits from being damaged under overload conditions.
The open in the fuse can be caused by the following:
1. Short circuit in the brush motor wiring harness; fault in the motor.
2. Overvoltage of the gearmotor.

One brush do not turn
Possible causes:
1. The brush motor electromagnetic switch wiring harness is damaged (repair).
2. The brush motor electromagnetic switch (ES1) is damaged (replace).
3. The brush motor fuse (F1) is tripped (reset).
4. The motor is faulty (repair or replace).
5. The wiring harness is damaged (repair).

Malfunction of the brush deck mechanical rotation system
Possible causes:
1. The rubber pads between deck and brush are worn (replace).
2. The rubber damping joint is worn (replace).
3. The end-of-stroke cable is broken (replace).

WIRING DIAGRAM



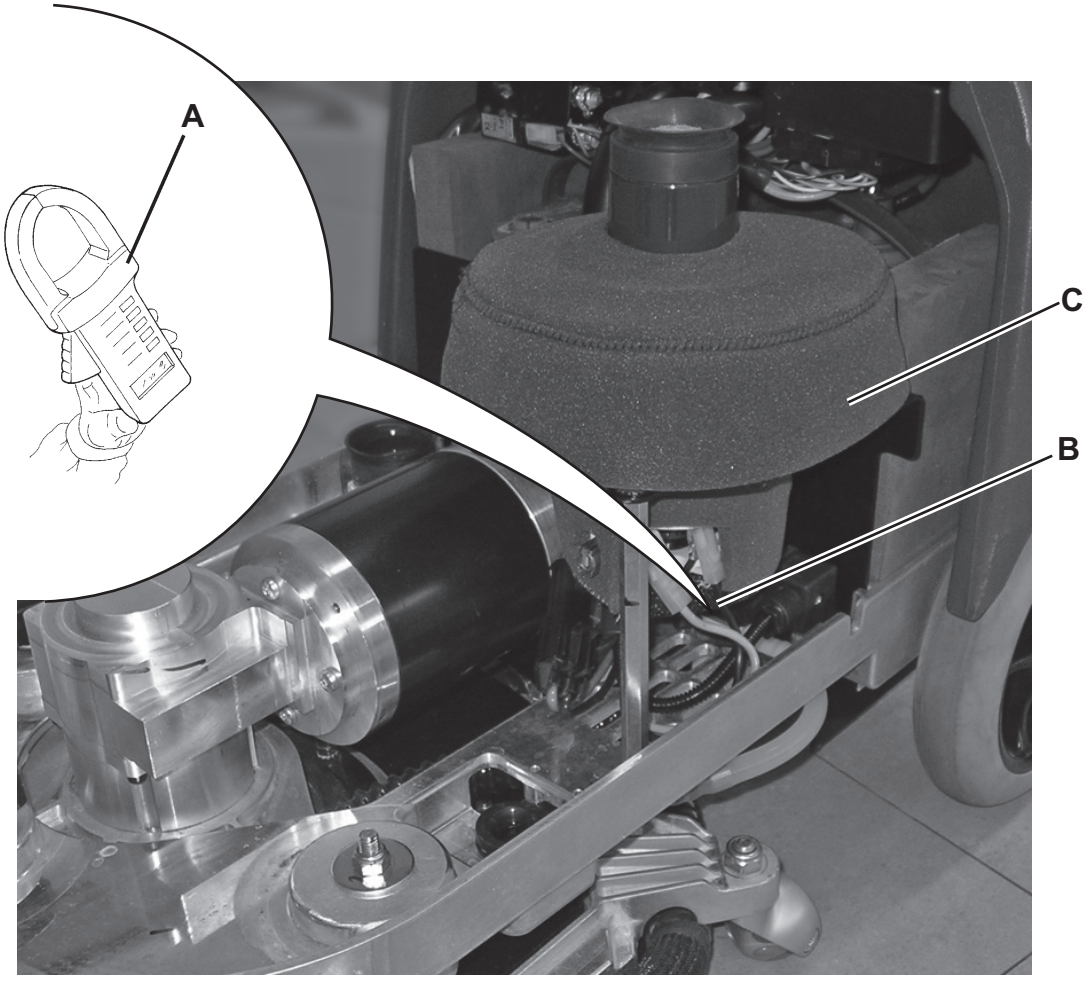
P100425

RECOVERY WATER SYSTEM

VACUUM SYSTEM MOTOR ELECTRICAL INPUT CHECK

WARNING!
This procedure must be performed by qualified personnel only.

1. Remove the solution and recovery water tanks.
2. Apply the amperometric pliers (A) on the cable (B).
3. Turn the knob (32) to program (35).
4. Check that the motor electrical input is between 15 and 18 A at 12 V.
5. Turn the knob (32) to “0”.
   Remove the amperometric pliers (B).
   If the electrical input is higher than specified, disassemble the vacuum system motor (see the procedure in the relevant paragraph), and check the condition of its moving parts.
   If the procedure do not lead to a correct electrical input, it is necessary to replace the motor.



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RECOVERY WATER SYSTEM

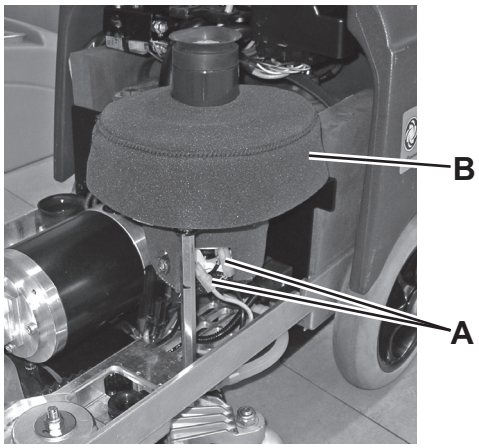
VACUUM SYSTEM MOTOR DISASSEMBLY/ASSEMBLY

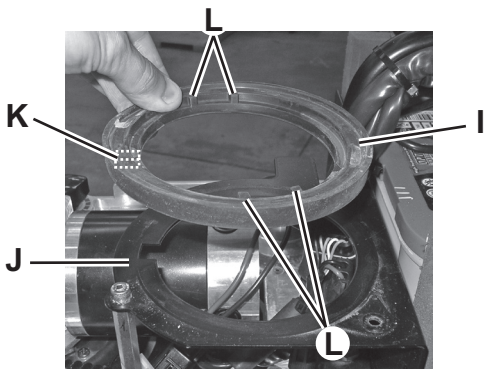
Disassembly

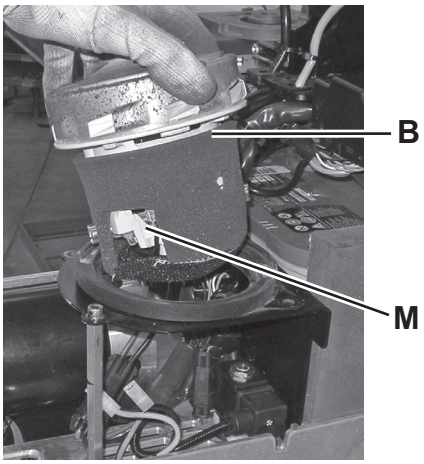
1. Remove the solution and recovery water tanks.
2. Make sure that the battery connector is disconnected.
3. Disconnect the 2 connectors (A) of the motor (B).
4. Remove the acoustic insulation panel (C).
5. Remove the screws (D), recover the washers and nuts.
6. Remove the motor cover (E) and recover the gasket (F).
7. Remove the motor (B) and the acoustic insulation pipe (G)
8. Check the gasket (F) and the gasket (H) for efficiency. If necessary, replace.

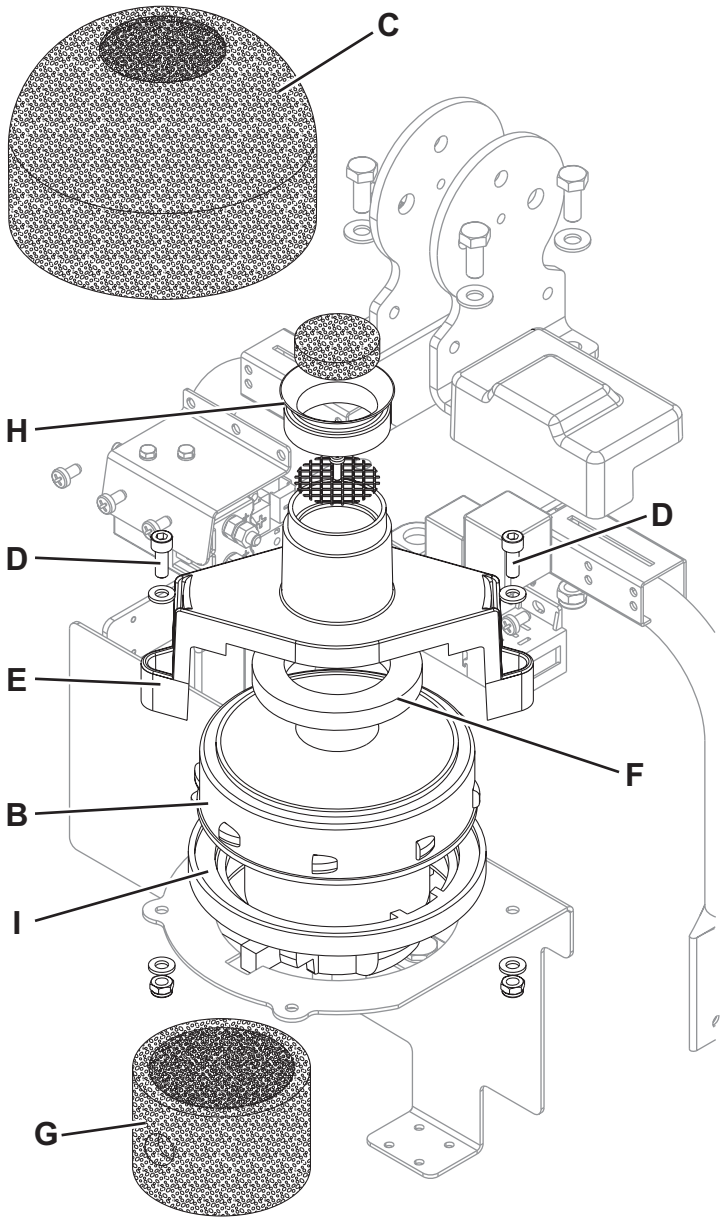
Assembly

9. Assemble the components in the reverse order of disassembly and note the following:
   - When installing the gasket (I) into the housing (J) turn it until the lower tooth (K) and upper teeth (L) are as shown in the figure.
   - Install the motor (B) with the power supply contacts as shown in the figure (M).









P100427

TROUBLESHOOTING

The vacuum system motor does not turn on

Possible causes:

1. The vacuum system motor wiring harness is damaged or disconnected (repair / connect).
2. The fuse (F2) is blown (replace).
3. The vacuum system motor is faulty (check the electrical input).

Dirty water vacuuming is insufficient or there is no vacuuming

Possible causes:

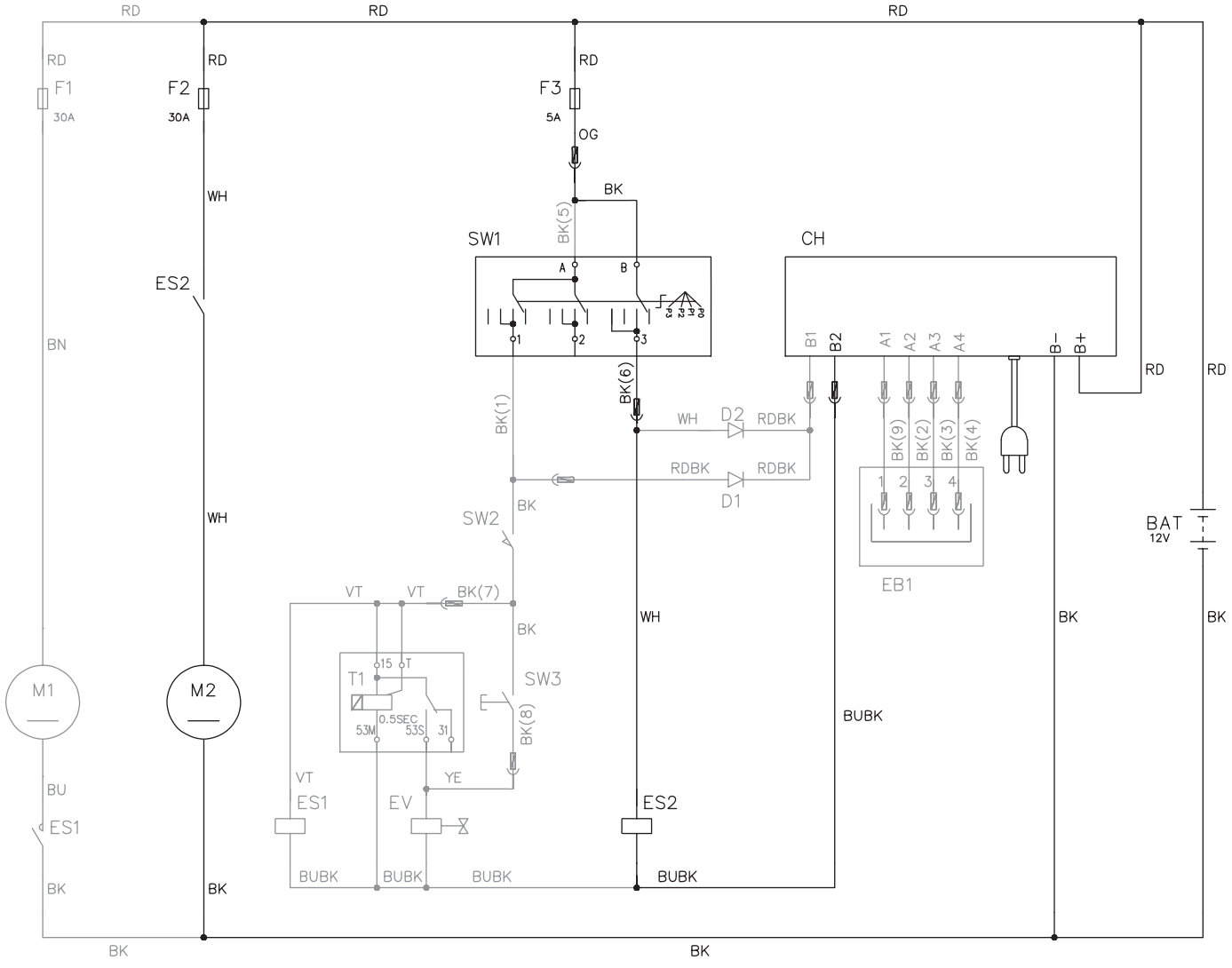
1. The vacuum grid with automatic shut-off float is activated because the recovery tank is full (empty the recovery tank).
2. The debris tray is clogged (clean).
3. The vacuum grid with automatic shut-off float is dirty, or the vacuum pre-filter is dirty (clean).
4. The tank cover is not correctly positioned (adjust).
5. The tank cover gasket is not efficient (replace/clean).
6. The vacuum system motor filter is dirty (clean).
7. The squeegee or the vacuum hose is clogged or damaged (clean or repair/replace).
8. The vacuum gaskets are damaged or do not match perfectly (repair or replace).

The squeegee leaves lining on the floor or does not collect water

Possible causes:

1. There is debris under the blade (remove).
2. The squeegee blade edges are torn or worn (replace).

WIRING DIAGRAM



OTHER SYSTEMS

OTHER SYSTEMS

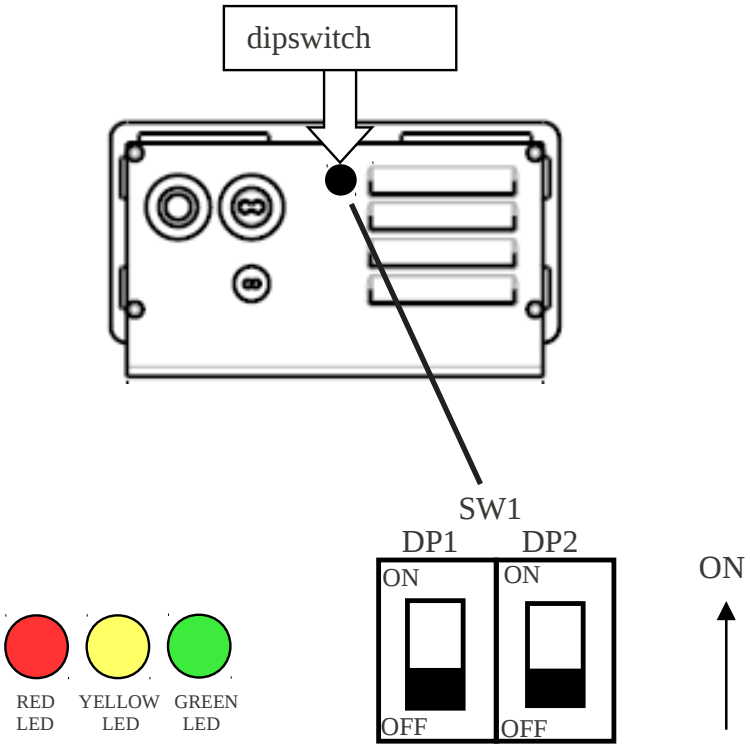
SCREW AND NUT TIGHTENING CHECK

1. Drive the machine on a level floor with the recovery tank empty.
2. Turn the ignition key to “0” and disconnect the batteries.
3. Carefully lift the tank assembly.
4. Then check:
   - Tightening of mounting screws and nuts
   - Correct position of fasteners
   - Visible faults in the components
   - Leaks
7. Carefully lower the tank assembly.

ELECTRICAL SYSTEM

BATTERY CHARGER SETTING DIPSWITCH CONFIGURATION

To change the dipswitch configuration, please remove the round black cap located close to the openings on the bottom of the charger (see the picture below), using a tool like a screwdriver.



SW1		LED CODE (*)	CHARGING CURVE
DP1	**DP2**	**Battery LEDs**	
ON	ON	2 flashes of GREEN	IUU0-GEL for generic Gel and AGM batteries
ON	OFF	2 flashes of RED & GREEN	IUIa-AGM for DISCOVER AGM batteries
OFF	ON	2 flashes of YELLOW & GREEN	IUIa-OPTIMA for OPTIMA batteries (**default**)
OFF	OFF	2 flashes of YELLOW	IUIa-GEL for EXIDE SONNENSCHEIN Gel batteries

(*) The LED code is shown by the battery status LEDs every time the charger is powered on, before to start the charging cycle.

BATTERY CHARGER ADDITIONAL FUNCTIONS

The battery charger is also used for:
1. Check the battery voltage during machine operation.
2. Display the battery status through the LED (EB1).
3. Stop the machine when the battery is discharged.
4. Avoid the machine operation during the battery recharging.

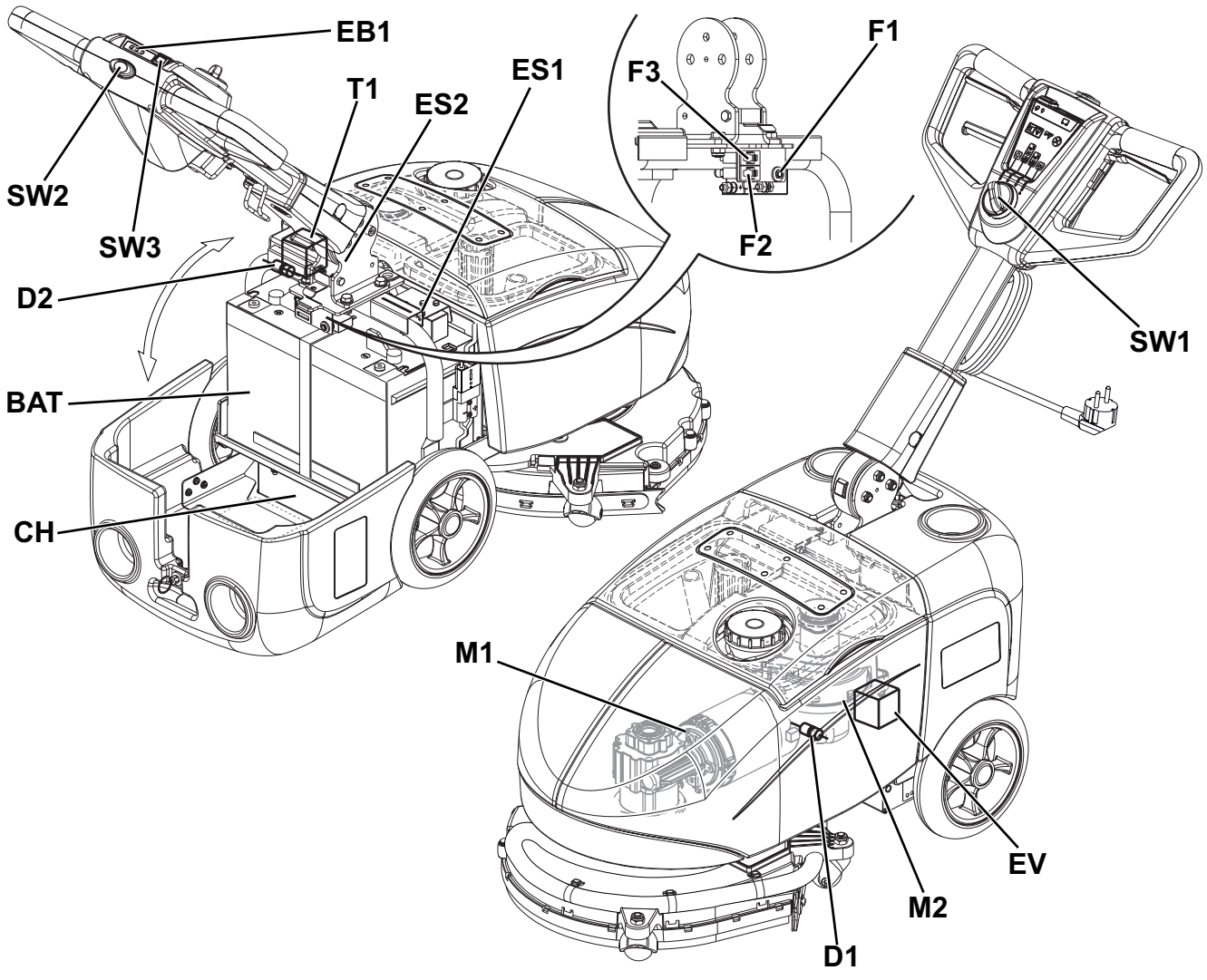
For this porpouse the following auxiliary battery charger contacts are used:
– B1: (ref. + 12V) input signal for switching on the machine.
– B2: (refer to 0V) output signal for activating machine functions.

ELECTRICAL SYSTEM

ELECTRICAL COMPONENT LAYOUT

Key

BAT	12V battery
CH	Battery charger
D1	Diode
D2	Diode
EB1	Battery charger electronic board
ES1	Brush electromagnetic switch
ES2	Vacuum system relay
EV	Solution solenoid valve
F1	Brush resettable fuse
F2	Vacuum system fuse (30 A)
F3	Selector fuse (5 A)
M1	Brush motor
M2	Vacuum system motor
SW1	Rotary function selector
SW2	M1-EV enabling switch
SW3	Solution rate switch
T1	Solenoid valve timer



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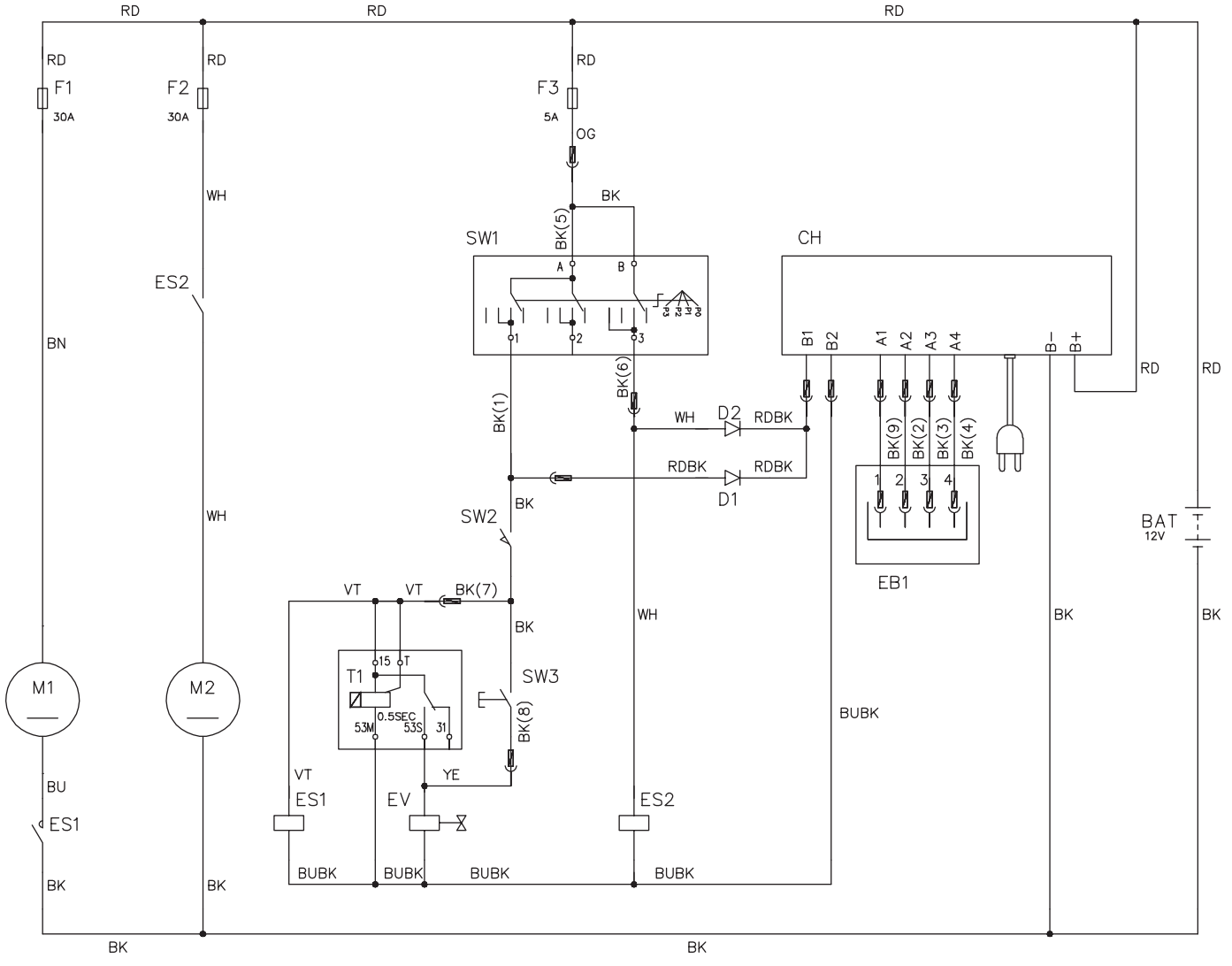
WIRING DIAGRAM

Key

BAT	12V battery
CH	Battery charger
D1	Diode
D2	Diode
EB1	Display LED electronic board
ES1	Brush electromagnetic switch
ES2	Vacuum system relay
EV	Solution solenoid valve
F1	Brush resettable fuse
F2	Vacuum system fuse (30 A)
F3	Selector fuse (5 A)
M1	Brush motor
M2	Vacuum system motor
SW1	Rotary function selector
SW2	M1-EV enabling switch
SW3	Solution rate switch
T1	Solenoid valve timer

Colour codes

BK	Black
BU	Blue
BN	Brown
GN	Green
GY	Grey
OG	Orange
PK	Pink
RD	Red
VT	Violet
WH	White
YE	Yellow



Nilfisk
setting standards

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